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Mussel culture in India: Methods, Problems & Prospects

P. Sunil Kumar
Central Marine Fisheries Research Institute, Cochin.

Introduction

Mussels are the best candidate Species for culture in India. They are efficient filter feeders and have faster growth rate than other cultivable species of molluscs. They have high shell to flesh ratio and are the cheapest source of protein available for the rural folks. The technology for the culture as well as hatchery production of spat have been standardized by Central Marine Fisheries research institute and National institute of Oceanography in the late seventies. But even then entrepreneurs and farmers have not taken up mussel culture on a commercial scale because of certain bottlenecks in its culture. The annual landings of mussels in India during the period 1997-1998 was about 4500 tonnes. Among this the contribution from culture was only about 500 tonnes. This calls for the necessity to expand mussel culture operations in India.

Resources and distribution

In India only two species of mussels are available; the green mussel *Pema viridis* and the brown mussel *Pema indica*. The green mussel enjoys a wider distribution along both east and west coasts of India. It is distributed in Chilka Lake, Kakinada, Madras, Pondicherry, Porto Novo and Andaman and Nicobar islands along the east coast and in Quilon, Alleppey, Cochin, Calicut, Kasargode, Mangalore, Karwar, Goa and Gulf of Kutch along the west coast. But brown mussel is restricted only to the southwest coast, from Quilon to Cape Comorin.

Growth and reproduction

P. viridis grows to a size of 60 - 65 mm in 3 - 4 months period where as *P. indica* grows to a size of 50 - 55 mm during the same period. Both species attain maturity at a size of 15 - 28 mm. The spawning season for *P. viridis* is September to March. *P. indica* spawns during May to September with a peak in May.

Farming techniques

1. Site selection

The site should be free off pollutants. Enclosed areas like bays with good plankton growth are usually preferred for culture. The current speed should be 2 cm/s and the site should have a depth of minimum 2 metres. Distance from the bar mouth is important in the culture of estuarine species. Brood stock and seeds should be available near the farm site. The site should have proximity to market.

2. Farm construction

Off bottom culture is preferred to ensure better growth of the culture species. The culture units should be laid down perpendicular to wave action in the direction of currents. The material used for construction should be durable. Adequate spacing must be given between the seeds inorder to facilitate faster growth.

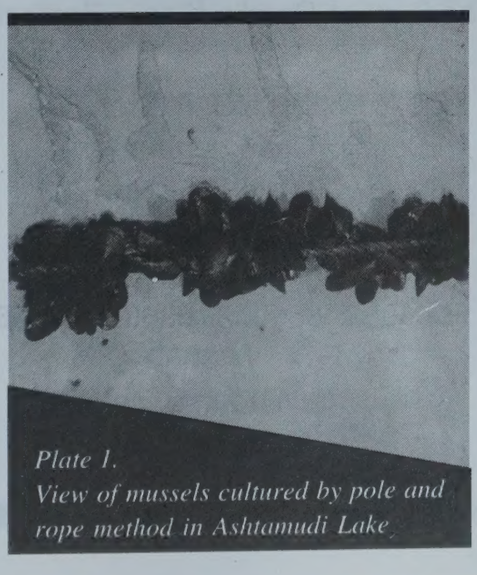

Plate 1.
View of mussels cultured by pole and rope method in Ashtamudi Lake

3. Seed collection

Seeds are collected either from the natural beds or by using spat collectors. From intertidal areas they are collected by hand picking or scrapping and from deeper areas by diving. Spat collectors like rens, lime coated tiles, tyres, tubes, nylon and coir should be laid down before spawning period. Seeds are transported in seawater with frequent water exchange or in wet gunny bags which can retain moisture for quite a long period.

4. Seeding

Coir rope of 1520 mm diameter or nylon rope of 12 mm diameter is used for seeding. 100-150 numbers of size 15-25 mm and weight 600 grams are wrapped around nylon rope of 1 meter length with banian cloth and knitted at fixed intervals. After 7-10 days the cloth material will disintegrate, by the time the spat gets attached to the rope by the help of their byssus threads. Seeding is done during the cool hours of the day preferably during early morning hours. Overcrowding should be avoided since it may affect the growth of mussels. Wooden pegs are inserted at frequent intervals to give additional support to the weight of fully grown mussels at the time of harvest.

5. Culture methods

On bottom culture, which is an age-old practice in European countries like Holland, Denmark and Germany is not being done in India. Among off bottom or suspension culture methods only experimental raft culture and long line culture have been attempted in India. In long line culture long lines of standard size 60 x 60 m are used for open sea mariculture of mussel. HDP rope of 20-25 mm thickness is anchored by 150 kg concrete blocks. 10-12 ropes, which can hold about 1000 seeds are hung from the main line and grown.

Pole and rope method is picking up well in the estuarine areas of several parts of the country. Teak poles are driven into the muddy substratum. They are connected horizontally with small wooden poles and strings containing 100 -150 mussels are suspended from this framework. A view of mussels cultured by this method is shown in plate 1.

Raff culture is the common method for mussel culture. 6 x 6 or 6 x 8 m sized rafts are ideal for culture. A wooden platform is made of 6 meter long teak poles by lashing them with nylon or coir ropes. Metal or oil drums of 200 litre capacity are used as float to provide buoyancy to the whole structure. The unit is anchored using concrete blocks of 150 kg. Seeds can be suspended either from rectangular cages or from strings. 50-100 seeded ropes are suspended from a raft unit.

6. Farm management

Periodic thinning of ropes should be done to provide sufficient space for the mussels to grow. Cages and ropes should be cleaned frequently to minimize the attack of foulers and borers. A close vigilance over the site is essential to ward off problems like poaching.

7. Production and post harvest technology

Production rate of 150mt/ha is achieved in five months period. Harvesting is done by scrapping the animals with the help of chisel followed by depuration in clean seawater pumped into storage tanks. The mussels are kept in sterilized seawater (23 ppm chlorine or 1-2 mg of ozone per litre) for a period of 24 - 48 hours. The depurated mussels are either consumed locally or packed in frozen, canned or smoked form

Problems

The problems in mussel culture are categorized into environmental, biological and social and institutional. The major environmental problems include pollution, disease and algal blooming. Algal toxins can lead to severe health hazards in man. Poor quality control aspects, scanty information available on the biology and physiology of mussel, poor survival rates during transportation, predation by crabs, sea urchin etc. and attack by fouling and boring organisms like sponges, algae etc. are some of the biological problems involved in mussel culture. Legal problems include clashes between farmers and local fisherman and poaching. Less demand in export market, low price etc. are some other problems concerned with mussel culture activities in India.

Prospects

Mussels have a higher rate of production and are suitable for culture in coastal areas. In India seeds are available throughout the year except during monsoon period. More over we are blessed with vast areas like bays and enclosures that are suitable for culture activities. Research on the biology, culture techniques and post harvest technology need to be strengthened. Quality control measures that are currently being used should be improved. Government and financial agencies should come up to promote mussel culture activities. Training should be given to farmers and fisherman to empower them with the technical advancements made in the filed of mussel culture. Proper establishment of this industry would promise employment opportunities in the coastal areas and provide for protein requirement of the people of the developing countries.

SPECIAL REQUIREMENTS FOR ORGANIC SALMON CERTIFICATION

The possession of a coveted 'organic' certification for salmon , which commands a 15% to 25% price premium, demands that the fish should have been fed on a special diet. The UK's Soil Association, which currently certifies all organic salmon produced in the UK. places four stringent conditions on the feed used.

The feed manufacturer's premises and feed formulations must be inspected and certified as conforming to Soil Association standards; this covers the use of separate production and handling facilities for organic feed.

At least 50% of feed ingredients of aquatic origin must be derived from the by-products of wild caught fish processed for human consumption; the balance must come from approved, sustainable fisheries.

All other feed ingredients must be of approved organic origin.

Only shrimp shell can be used for flesh pigmentation; the use of chemically produced pigment such as canthaxanthin and astaxanthin is banned; the Soil Association has granted a derogation to permit the inclusion of a natural pigment in feed for broodstock, on animal welfare grounds, since the ova of Atlantic salmon need to have a good pigmentation.

Scheme for Development of Infrastructural facilities

The Ministry of Food Processing Industries has been operating several plan schemes for the development of processed food sector in the country since the inception of Eighth Plan Period (1992-97). Taking into account the recommendations of the Working Group of Planning Commission, the constraints faced by Industry, the need to accelerate growth of this sector, and the priority status accorded to it by Government, the Ministry of Food Processing Industries proposes to operate the following Plan schemes during the Ninth Plan, Commencing in 1997.

The scheme aims to support for creation of infrastructural facilities in various sectors of food processing industries. It has the following 3 components:

COMPONENT-1:

ESTABLISHMENT OF POST-HARVEST INFRASTRUCTURE AND COLD-CHAIN FACILITIES FOR FOOD PROCESSING AND INTEGRATED PROJECTS OF MUSHROOMS, HOPS, GHERKINS AND BABY CORN

Objectives

(a) Provide/develop post harvest infrastructure like establishment of cold storage and cold chain facilities etc.

Under the Scheme of Infrastructure facilities, assistance for setting up of cold storage will be limited to :

(i) Setting up of modified/controlled atmospheric cold storage.

(ii) Cold storage which is an integral part of processing activities.

(iii) Cold storage which is a part of setting up food parks.

(iv) For commodities other than horticulture produce.

(b) Build up efficient post harvest handling system right from the farm to retail marketing.

(c) Develop setting up pre-cooling facilities, refrigerated transportation system and refrigerated retail outlets.

(d) Develop cold storage system etc. (major ports and airports for food products meant for export)

Pattern of Assistance

PSUs/Joint Sector/ NGOs/Cooperatives Private Sector	50% of the cost of capital equipment and technical civil works upto to Rs. 25 lakhs. In general areas and upto 50 lakhs in difficult areas.	**Grant**
Private Sector	25% of the cost of capital equipment and technical civil works upto Rs. 50 lakhs in general areas and 33.33% upto Rs. 75 lakhs in difficult areas.	**Grant**

COMPONENT-2:

ESTABLISHMENT OF FOOD PROCESSING INDUSTRIAL ESTATES/FOOD PARKS

Objectives

To help establish Food Processing Industrial Estates/ parks by providing assistance for common facilities such as uninterrupted power supply, water supply, cold storage/ice plant/ware-housing facilities, effluent treatment plant quality control and analytical laboratory and major processing facilities like Fruit Concentrate/Pulp making unit etc.

Pattern of Assistance

PSUs/Joint/Assisted Private Sector/ NGOs/Cooperatives	Upto Rs. 4 crores for creation of common facilities.	**Grant**

COMPONENT-3:

INFRASTRUCTURAL FACILITIES FOR PRESERVEATION AND PROCESSING OF FISH

Objectives

The main objectives are to create additional facilities for preservation and processing of fish so that the benefits of the same are available to traditional fisher persons.

Pattern of Assistance

NGOs/Cooperatives	50% of the cost of capital equipment and technical civil works upto to Rs. 25 lakhs in general areas and upto 50 lakhs in difficult areas.	**Grant**
PSUs	50% of the cost of capital equipment and technical civil works upto 50 lakhs in difficult areas.	**Grant**
Private Sector	25% of the cost of capital equipment and technical civil works upto Rs. 50 lakh in general areas and 33.33% upto 75 lakhs in difficult areas.	**Grant**

SCHEME FOR SETTING UP/EXPANSION / MODERNISATION OF FOOD PROCESSING INDUSTRIES

The scheme has the following three components:

COMPONENT -1: SETTING UP/EXPANSION /MODERNIZATION OF FOOD PROCESSING UNITS

Objectives

Provision of assistance for setting up of food processing units including those of milk products spices, coconut, walnut and cashew nut or upgradation and expansion of such units. This will also include establishment of infrastructural facilities for mushroom cultivation and Processing consisting of:

I) Composed Pasteurization units
II) Spawn lab
III) Other Processing facilities
IV) Marketing support etc.

In case of setting up of hops processing plant, Procurement of pipes and supporting structure, support for cultivation practices would qualify for assistance.

Pattern of Assistance

PSUs	50% of cost of capital equipment and technical civil works upto to Rs. 50 lakhs in difficult areas.	**Grant**
NGOs/Cooperatives	25% of cost of capital equipment and technical civil works upto 25 lakhs in difficult areas.	**Grant**
Private Sector	25% of the cost of capital equipment and technical civil works upto Rs. 50 lakh in general areas and 33.33% upto 75 lakhs in difficult areas.	**Grant**

COMPONENT-2:

SCHEME FOR MODERNIZATION OF PULSE MILLING UNITS

Objectives

Installation of dryers and dust control system for drying of pulses/control of dust during processing far achieving productivity and efficiency.

Pattern of Assistance

PSUs/NGOs/ Cooperatives Joint/ Assisted Private Sector	50% of cost of of Dryer and Dust Control System upto Rs. 2.75 lakhs in all areas	**Grant**

Terms & Conditions

The implementing agencies are required to produce copies of bills from the equipment supplier as well as proof of having installed them.

COMPONENT-3:

DESSEMINATION OF LOW COST PRESERVATION TECHNOLOGY

Objectives

To encourage setting up units using low cost preservation technology developed by National Institutions.

Pattern of Assistance

NGOs/Cooperatives/ PSUs	Actual cost of technology (charged by CFTRI/other national R&D institutes) and plant and equipment upto Rs. 5 lakhs in both general and difficult areas.	**Grant**

SCHEME FOR RESEARCH AND DEVELOPMENT IN FOOD PROCESSING INDUSTRIES

Objectives

1. Undertake specific R&D Projects on/relating to:
   (i) Processing of cereals, pulses, coarse grains and millets and also for improving traditional/regional foods made from them;
   (ii) Utilization of by products of primary food processing like paddy husk, germ, paddy-straw, pulses-corn, peri carp brokens etc.
   (iii) Study prevailing post-harvest technology of millets like ragi, jowar and bajra and devise improvements thereto, and develop technologies for the purpose suited to our conditions;
   (iv) Development of processing technology for the production of intermediate and finished food product production including design and building of prototype equipment/pilot plants;
   (v) Fortification of cereals/cereal products for enhancing the nutritional level of our population, especially women and children: and
   (vi) Traditional Foods of various regions of the country.
2. Update processing, packing and storage technologies for all major processed food products so that they meet International Standards.
3. Standardization of various factors such as bacteriological standards, preservation standards, additives, pesticide residue etc. of meat and meat products, development of value added products of commercial importance, and encourage entrepreneurs to take by hygienic meat processing including through the setting up of modern meat processing plants.
4. Take up Research & Development work for traditional milk products. R&D work on packaging of milk products will also be supported, with a view to increase the shelf-life and better consumer acceptability and improvement of quality with introduction of packaging material.
5. Development of value added products using low value fish, product development, standardization of processing technology for non-conventional marine resources like snails, clams, mussels, oysters etc., and development of low cost, packaging technology. It will also include development of suitable fishing gear and other accessories for exploitation of non-shrimp resources and setting up quality control laboratories.
6. Financial Assistance would be available for setting up of Quality Control Laboratory for all processed foods. Such assistance will be limited to the entire cost of capital equipment required for setting up of such laboratories. The facilities thus created will be common and may be availed of by other food processing units in and around the area. All implementing agencies would be eligible for such assistance.
7. Development of new cost effective packaging for food products based on traditional foods, common food gains. dairy products etc. for both domestic and export purposes. Development of design of equipment for manufacture of such products, development of new inexpensive packaging techniques and equipments, analysis of existing packaging methods, materials processes, quality control norms studies about improvement in the currently used systems; studies about newer packaging possibilities.

Eligibility

(i) Agricultural Universities, Research Institutions including Central Food Technological Research Institute, Veterinary Colleges, Cooperatives, National Dairy Research Institute (Karnal), Indian institute of Packaging, Defence Food Research Laboratory and other reputed national institutions of research & development.

(ii) Industry Associations, NGOs, Voluntary Agencies and Private Entrepreneurs, where common facilities need to be established for the use of industry.

(iii) Private, Public and Joint Sector Companies taking up Research & Development projects individually or jointly with government laboratories. IITs, Universities, or on the basis of a consortium of companies.

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Pattern of Assistance

Laboratories/IITs/ Universities/NGOs & other similar non-profit organisations	100% of the Project Cost	**Grant**
Public Sector/Joint Sector/Assisted Sector/Private Sector	1/3rd of the Project Cost	**Grant**

Ownership of know-how and intellectual property and other conditions

(1) It will be one of the pre-conditions for sanction of any R&D Project that
   (i) Where the project-executing institution is a laboratory/IIT/University, the know-how and all other aspects of intellectual property generated as a result of the project will be owned wholly by MFPI.
   (ii) Where the project-executing institution is a commercial company, the intellectual property (in all forms) generated, as a result of the project will be jointly owned by MFPI and the companies.

(2) In cases where assistance for R & D activities is sought by commercial companies of any type-public, joint or private or by an entrepreneur, MFPI will reserve the right to license the know-how developed under the project to other companies, after a mutually negotiated period of exclusive right of production and sale by the company which undertook the project.

(3) Where assistance is sought for quality control laboratories, an undertaking should be given that the facilities thus established would be allowed to be used by other industrial units also.

SCHEME FOR PERSON POWER DEVELOPMENT IN FOOD PROCESSING INDUSTRIES

The scheme has the following four components:

(i) Personpower development in rural areas (Food Processing & Training Centres or FPTCs).
(ii) Personpower development in grain processing industries.
(iii) Training of personpower in meat processing.
(iv) Training of traditional fisher persons.
(v) Creation of infrastructural facilities
(vi) Training programmes sponsored by MFPI

COMPONENT-1

PERSON POWER DEVELOPMENT IN RURAL AREAS (FOOD PROCESSING AND TRAINING CENTRES FOR FPTCS)

Objectives

Development of rural entrepreneurship and Transfer of technology for processing of food products by utilising locally grown raw materials and providing 'handson' experience at such production cum training centres, while according priority to SC / ST / OBC and women.

Eligibility

Central or State Government Organisations, Educational and Technical Institutions, NGOs and Cooperatives, provided the implementing agency is willing to make available the required accommodation, personpower and other infrastructural facilities.

Pattern of Assistance

Grant-in-aid would be available to the FPTCs to the following extent:

Single Product Line Centre (for any one group of processing activities).	Rs. 2.00 lakhs for Fixed Capital Cost and Rs. 1.00 lakh as revolving seed capital.	**Grant**
Multi Power Line Centre (for more than one group of processing activities).	Rs. 7.50 lakhs for Fixed Capital Cost and Rs. 2.00 lakhs as revolving seed capital.	**Grant**
For training the trainers at recognised institutes such as CFTRI, Mysore.	Upto Rs. 0.50 lakh one time assistance, subject to actuals on TA/DA etc.	**Grant**

Recurring expenditure needed for the revolving seed capital on raw materials and consumables (preservative / additives / packaging) is expected to be recouped from sale proceeds of products processed at the centre and the processing fees paid by the growers of raw materials.

COMPONENT-2:

PERSONPOWER DEVELOPMENT FOR GRAIN PROCESSING

Objectives

Imparting training in flour milling technical for quality for-control of raw materials/finished product preventive maintenance sanitation hygiene and development of organisation planning ability.

Eligibility

CFTRI, Mysore

Pattern of Assistance

The quantum of assistance would be decided depending upon the merits of the proposal.

COMPONENT-3:

PERSOSPOWER DEVELOPMENT IN MEAT PROCESSING

Objectives

Training of persons engaged in traditional meat processing activity, in-service workers and unemployed persons.

Eligibility

Central Institutes, Agricultural Universities/ Veterinary Colleges, Modern Meat & Poultry Processing Plants, Slaughter Houses, Meat Corporations and NGOs, are eligible to be considered for assistance.

Pattern of Assistance

Assistance upto Rs. 4000/- per trainee towards cost of boarding, lodging, training material and stipend to SC / ST and women trainees. The training will be imparted to all the assistance of Rs. 4000/- per trainee is applicable. However, stipend will be given only to those trainees belonging to SC/ ST and Women. Over all limit of Rs. 4000/- will remain.

COMPONENT -4:

TRAINING OF TRADITIONAL FISHER PERSONS FOR SKILL UPGRADATION IN FISH PROCESSING

Objectives

Training of persons engaged in fish processing units for upgrading and enforcing hygienic conditions.

Pattern of Assistance

Entire cost of training will be provided to Central / State Government institutes in the form of grant.

COMPONENT-5:

CREATION OF INFRASTRUCTURAL FACILITIES

Objectives

Creation of infrastructural facilities like library, laboratories, pilot plants etc. for running Degree/Diploma courses and training programmes for food processing.

Pattern of Assistance

Grant upto Rs. 50 lakhs would be provided to HRD institutions such as colleges, universities, technical institutions, etc.

COMPONENT-6:

TRAINING PROGRAMMES SPONSORED BY MFPI

Objectives

Conducting training programmes sponsored by Min. of FPI in various areas of food processing.

Pattern of Assistance

Grant will be provided to institutions organizing such training. Quantum of assistance will be subject to the number of trainees and the duration of training.

SCHEME FOR STRENGTHENING OF TRADITIONAL FISH PROCESSING TECHNOLOGIES AND MARKETING

Objectives

Propagation of low cost indigenous technologies for drying of fish, which will result in value addition, and provide hygienically dried fish for domestic and export market.

Pattern of Assistance

NGO/Cooperatives/ PSUs/Joint/ Assisted/Private Sector	50% of the capital cost upto Rs. 10 lakhs in general areas and 75% of the capital cost upto Rs. 10 lakhs in difficult areas	**Grant**

Research & Development Organisation	100% of the cost for setting up of a demonstration unit to popularize the traditional fish processing technologies and marketing among the entrepreneurs/fishery folks.	**Grant**

SCHEME FOR UTILIZATION OF LOW VALUE FISH TO MAKE VALUE ADDED PRODUCTS

Objectives

Establishment of units for commercial production of value added products like protein concentrates, fish wafers, fish sausages, fish soup, fish cutlets, fish balls, fish feed etc, using low value fish.

Pattern of Assistance

NGO/Joint/ Assisted/ Cooperatives/PSUs/ Private Sector	50% of the capital cost upto Rs. 10 lakhs in general areas and 75% of the capital cost upto Rs. 10 lakhs in difficult areas	**Grant**
Research & Development Organisation	100% of the cost for setting up of a demonstration unit with a view to popularize utilization of low value fish.	**Grant**

SCHEME FOR DEVELOPMENT/ IMPROVEMENT OF MARKETING, QUALITY CONTROL, STORAGE & TRANSPORT OF MEAT & MEAT PRODUCTS

Objectives

Provision of deep freezers/refrigerators to retail outlet marketing complexes for development of meat markets and shopping centers.

Provision of insulators, refrigerated/chilled vans for transportation of meat, and establishment/improvement of quality control laboratories.

Pattern of Assistance

NGO/Cooperatives/ PSUs/Joint/ Assisted/Private Sector	50% of the total cost subject to a maximum of Rs. 10 lakhs in general as well as difficult areas.	**Grant**

SCHEME FOR GENERIC ADVERTISMENT ON PROCESSED FOODS AND MARKETING ASSISTANCE

Objectives

Build awareness among consumers about the advantages of processed foods, and their quality assurance mechanism, both through (i) Generic Advertisement and publicity and (ii) Market Promotion Campaign for new Products Mix and Brand name support.

Pattern of Assistance

Central / State Govt. Organization	50% of the cost of campaign upto Rs. 25 lakhs.	**Grant**
NGOs/Cooperatives	50% of the cost of campaign upto Rs. 10 lakhs per annum for a maximum period of two years.	**Grant**
Industry Association	Will be entitled to assistance for generic advertisement only. The assistance will be offered 90% of the Project Cost for the first two years (97/98 and 98/99) 80% for the next two years (99/2000 & 2000/2001) and 70% for the last year of the 9th Plan (2001/2002).	**Grant**
Private Sector/ Assisted Sector	Assistance would be restricted to 40% of the total cost subject to a ceiling of Rs. 2 lakhs per beneficiary for publicity and promotion and 40% subject to a ceiling of Rs. 1 lakh per beneficiary for brand publicity through advertisement. The assistance will be available for a maximum period of two years.	**Grant**

Terms & Conditions

Private Sector / Assisted Sector units should be registered as a Small Scale Unit and holding a valid FPO license.

SCHEME FOR STRENGTHENING OF BACKWARD LINKEGES OF FOOD PROCESSING INDUSTIRES

Objectives

Increase capacity utilization of fruits & vegetables processing as well as grain and coarse grain, by ensuring regular supply of raw materials through contract farming. Ensure remunerative price to farmers by creating direct linkage between farmer and processor; Provide high quality seeds/ fertilizers/ pesticides and planting materials to farmers along with technical know-how etc. through the processor.

Pattern of Assistance

Joint/Assisted/ Private Sector/ NGOs/Cooperatives/ PSUs	Incentives in the form of reimbursement will be available upto 10% of the total purchase made by processors in a given year, limited to Rs. 10 lakhs per year for a maximum period of five years.	**Grant**

Terms & Conditions

Processing companies would be required to supply high quality seeds/ fertilizers / pesticides and technology to contracted farmers, along with necessary extension work at reasonable charge. The group of contracted farmers shall not be less than 25 in number. The processing unit should enter into a contract with the farmers atleast for a period of 1 year and the units should also keep the Ministry informed in advance of such contracts.

SCHEME FOR PROMOTION OF FOOD PROCESSING INDUSTRIES

This Scheme has the following four components :

(i) Strengthening of the Directorate of Fruit & Vegetables Processing for information, education and quality systems.

(ii) Participation in National /International Exhibitions/Fairs.

(iii) Promoting studies, surveys etc, in the Food Processing Sector

(iv) Performance Awards.

COMPONENT-1:

STRENGTHENING OF THE DIRECTORATE OF FRUIT & VEGETABLES PROCESSING

Objectives

Strengthening the Directorate of Fruit & Vegetables Processing including computerization: Compilation of information on different aspects of technology, machinery, packaging etc; Preparation of short-films on these aspects.

Pattern of Assistance

100% grant to Government Organization/Industry Associations/private Sector.

COMPONENT-2: PARTICIPATION IN NATIONAL / INTERNATIONAL EXHIBITIONS/FAIRS

Objectives

Dissemination of information regarding industry; familiarizing the existing and prospective entrepreneurs with modern techniques of production and packaging; development of market and popularization of products.

Pattern of Assistance

The Ministry in close association with APEDA, CFTRI, Industry Associations etc, would participate in exhibitions/ fairs. Expenditure incurred in this connection would cover publication of literature, holding of seminars, space rentals and other miscellaneous items for setting up theme pavilion etc. Quantum financial assistance would be decided depending upon the merits of the proposals.

For participation in the National/International exhibitions/fairs, State Governments/ State Government Organisations will be eligible for the financial assistance limited to 25% of space rental in order to enhance their participation in such events.

COMPONENT-3:

PROMOTING STUDIES/SURVEYS IN THE FOOD PROCESSING SECTOR

Objectives

To undertake studies and surveys for assessment of potential for food processing industries on sectoral and regional basis. Activities include organizing of seminar, workshops, symposia, to focus attention on the develop-

ment of food processing industries. The scheme envisages financial assistance for Entrepreneur Development Programmes (EDP)

Pattern of Assistance

Assistance is extended to government or academic bodies, industry associations, non-government organization etc. in the following manners.

(i) The amount provided for studies/feasibility reports/ surveys etc, shall be restricted to 50% of cost subject to maximum of Rs. 3 lakhs.

(ii) The support for seminars/meetings/entrepreneurial development programmers etc. shall be restricted to 50% of the cost subject to maximum of Rs. 1 lakh.

(iii) When the Ministry commissions such studies feasibility reports/surveys or sponsors/ co-sponsors seminar/symposia etc. there would be no ceiling to financial assistance provided.

(iv) Maximum assistance of Rs. 1 lakhs for EDP, which should be at least for period of 4 weeks with a follow up phase of 12 months and the number of trainees should not be less than 20. The objectives, course contents, selection criteria/procedure, expenditure break-up, follow-up & monitoring mechanism etc. should conform to the EDP guidelines.

COMPONENT-4:

PERFORMANCE AWARDS

Objectives

Provided encouragement/recognition to outstanding achievements of units in the food processing sectors and for augmenting efficiency through healthy competitive spirit through annual awards.

Pattern of Assistance

The National Productivity Council (NPC) has been the designated Agency for the purpose of implementation of this Scheme Component Assistance in the form of grant-in-aid will be provided to them.

SCHEME FOR STRENGTHENING OF NODAL AGENCIES

Objectives

Strengthen the State level Nodal Agencies for food processing industries, designated by the State Government, by providing financial support for installation of basic office hardware including computer system and internet for collection of detailed field information, preparation of data bane, monitoring of assisted projects, coordination of agro food business etc.

Pattern of Assistance

Lump sum grant up to Rs. 5 Lakhs for purchase of basic office equipment including computer system, internet etc. Further lump sum grant up to Rs. 5 lakhs for this purpose will be considered after a gap of five years. Additional sum upto Rs. 100000 per Nodal Agency per year for meeting the expenses on engaging personnel for preparation of data base, publication of profiles, office consumables etc.

Additional finance assistance for collection of detailed field information, preparation of data base etc. would be considered on merits and no amount is prefixed for this purpose.

SCHEME FOR SETTING UP OF DEMONSRATION UNITS/PILOT PROJECTS

SETTING UP OF MINI PULSE PROCESSING UNITS DEVELOPED BY CFTRI AS DEMONSTRATION UNITS

Objectives

To propagate and popularize Mini pulse mill developed by Central Food Technological Institute Mysore for socio-economic development in rural areas and promoting employment and better returns to pulse producers in pulse producing States.

Pattern of Assistance

NGOs/Cooperatives/ Joint/Assisted/ Private Sector	50% of the total cost of equipment including grader, feeder, electric motor, motor starter extra sieves, sales tax, packing, forwarding freight installation and commissioning charges or Rs. 35000 per unit/ beneficiary whichever is lower.	**Grant**

EXPLANATIONS

1. **General and Difficult Areas:** The scheme provides for differential scale of assistance for project to be set up in general and difficult areas of the country. It envisages

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Fax: 91-478-874029

Factory

A/P XII/555, Chandiroor, Alleppey

Phone: 91-478-872366 Mobile: 98460 48591

enhanced rate of assistance for difficult areas, i.e. Jammu & Kashmir, Himachal Pradesh , Sikkim, North-Eastern States. Andaman & Nicobar Islands, Laksha Dweep. Integrated Tribal Development Project (ITDP) areas.

2. **Release of Assistance :** Assistance in the form of grant would be released directly to the concerned implementing agencies through the bank or financial institutions wherever possible.
3. **Recommendations:** The proposals are required to be recommended by the concerned State Government or Nodal Agency designated by them. The PSUs and R&D institutes, however, would not need such recommendations.
4. **Joint & Assisted Sectors :** A Public Sector Undertaking (PSU) would at least hold 26% of the equity for a company to be in the Joint Sector, if the equity is less than 26% but more than 11% the company would be deemed to be in Assisted Sectors.

HOW TO APPLY

The promoters / organizers are required to send their proposals in the prescribed formats. There are separates application formats for (a) Infrastructure facilities & manufacturing units, (b) R&D Projects (c) Food processing & Training Centers (d) Exhibitions / Fairs / Seminars, (e) Entrepreneurs Development Programmes (EDPs) and (f) Study / Survey.

All proposals, except when those are made by PSUs and R&D institutes, would require to be recommended by State Nodal Agencies or Autonomous authorities.

The individual proposals would merit consideration only if those are accompanied with the following documents (wherever applicable):

1. Certificate of incorporation/registration of the organization
2. Memorandum and Articles of Association
3. Bye laws of the society
4. Annual Reports/Audited Statement of Accounts of last three years
5. Detailed Projects Report
6. Appraisal Report
7. Sanction letter for ten loan/working capital from banks/ financial institution
8. Biodata / background of the office bearers/promoters of the organization.
9. Information whether funding has been received/applied for from any other Government Agency
10. In case of FPTCs, copy of the rent agreement and letter from civic authority about availabilities of water, power and drainage system.

All applications may be sent to the following address

Ministry of Food Processing Industries
Panchsheel Bhawan,
August Kranti Marg , New Dehi-110049.
Tel: 011-6492216,6492174/6493227
Fax: 011-6493228/6493012
Email: mofpi@hub.nic.in
Website: http://www.nic.in / mofpi

CIFT demonstrates fish handling and processing practices in the NEH region

Hygiene and sanitation in fish handling, collection of air bladder from fish, preparation of fish pickle and ensilage from fish waste and fabrication and use of improved smoke kiln were demonstrated in the NEH region by the scientists of CIFT. Hygiene and sanitation in fish handing was demonstrated at Ganga market in Arunachal Pradesh and Bada Bazar in Meghalaya. With a view to utilising the huge fish waste generated at Meghalaya, collection of air bladder for preparation of icinglass and fish ensilage were shown to the people involved in fish sale and the officials of State Fisheries Department. Fish pickle was a new item to the people and the preparation of the same was watched with keen interest by them. They also participated in the preparation. The demonstration programmes were conducted in collaboration with Department of Fisheries of Arunachal Pradesh and Meghalaya. The scientific team from CIFT which conducted the programme in March 2002 consisted of Dr. M.K. Mukundan, Head, Quality Assurance & Management Division, Dr. Krishna Srinath, Head, Extension, Information & Statistics Division, Shri P.R.G. Varma, Principal Scientist, Shri J.K. Bandyopadhyay, Senior Scientist and Shri Panda, Technical Officer.

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Alsa Marine has state of the art cooking and freezing plants at Calcutta and Vizag and the plant at Chennai will be ready in six months. Leased plants at Bhubaneswar, Chennai and Cochin have also been upgraded. Alsa is on a list of USFDA and two of its factories are approved for EEC.

Equipped with state of the art facilities and a trained workforce, Alsa is poised to rapidly forge ahead into the future through a forceful expansion cum modernisation drive, at home and abroad. Alsa is recognised as a Trading House and is geared to attain Star Trading House status in the coming years.

Alsa Marine manages a 120 acre farm in Nellore, and is also an active participant in satellite farming. With a tie up with Biofeed Singapore, Alsa has brought in quality feed to the small and big farmers. Alsa Marine provides technology for different levels of culture activities; from the semi-intensive to extensive. Alsa Marine assists farmers in setting up of farms, right from selection of site to commercial operations and provides farm management assistance.

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Fax: +91-44-6212945/6539

BRINGING ASHORE THE PROSPERITY OF THE SEAS.

Improved Utilisation of Surimi Processing Waste of *Nemipterus* & *Priacanthus* spp.

George Ninan, Zynudheen A.A., Sen, A, and R. Badonia
Research Center of C.I.F.T., Matsya Bhavan Veraval (Guj) 362 269.

Post harvest losses are a major cause of concern in the fisheries sector. It is estimated that world over there is a loss of 2 million tons of wet fish per annum, in addition to 5 - 20 million tons discarded at sea as bycatch. In processing, especially in surimi production a lot of waste is being generated as only one fourth of the fish biomass is converted to surimi. The balance contains a considerable quantity, of edible meat. Like wise, waste from filleting is also having substantial quantities of recoverable meat. Even though surimi is a protein rich base product for the preparation of several value-added items, its nutritive value is comparatively lower than that of the corresponding mince.

Pink perch (*Nemipterus* sp.), Croaker (*Sciaenids*), Lizard fish (*Saurido tumhil*) and Big eye (Priacanthus spp.) etc. are used for surimi production. There is an estimated potential yield of 20,292 tonnes of *Priacanthus* spp. from the NW coast of India, which is the most dominant species of the non-conventional finfish resources along the entire EEZ. The annual landing of pink perch in Indian waters is estimated to be around 30,000 tons. The common available spp. of pink perch and big eye in Veraval are *Nemipterus japonicus* and *Priacanthus hamrur*. These are locally known as "Rani fish" and "Lal matchla" respectively. Reliable information is not available on the landings of these fishes. Heavy landings of these fishes have been observed since 2-3 years in Veraval. Actual landings seem to be substantially higher. The fishes are caught from comparatively deeper waters at the depth of 50-100meters. Most of the catch is from trawlers undertaking voyage fishing of 6-8 days duration. Present market rates for Pink perch ranges between Rs.6-12/ Kg and Big eye Rs.3-6/Kg. In Gujarat, there are two surimi-processing units located near Veraval and Porbunder. The average annual production of surimi in the state is 3633 tonnes (Anon.2000). In Veraval, there are many pre-processing centres where these species are beheaded and transported to the surimi manufacturing units. Based on the quantity of surimi exported from Gujarat, the quantum of the above-mentioned species used for the surimi production in the state is about 1520,000 Tonnes annually. Significant quantities of dressed fish are transported to Surimi plants in Mumbai and Ratnagiri. The cutting waste generated from the pre processing units is about 40% of the fish. This waste composes of the head, viscera and gills and it is used for the manufacture of fish meal and manure. Current practices in the pre-processing centres generate a lot of waste. A significant portion of this waste is the head portion of the fish attached with some portion of meat. During present study the recovery of good quality mince from the head waste and its better utilisation were attempted.

Methodology

Fresh head waste of *Nemipterus*

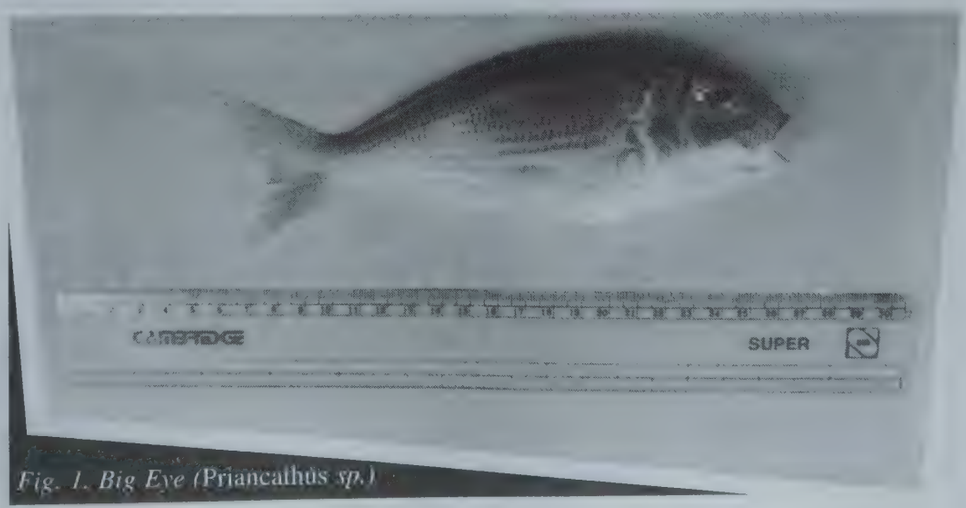


Fig. 1. Big Eye (Priancathus sp.)

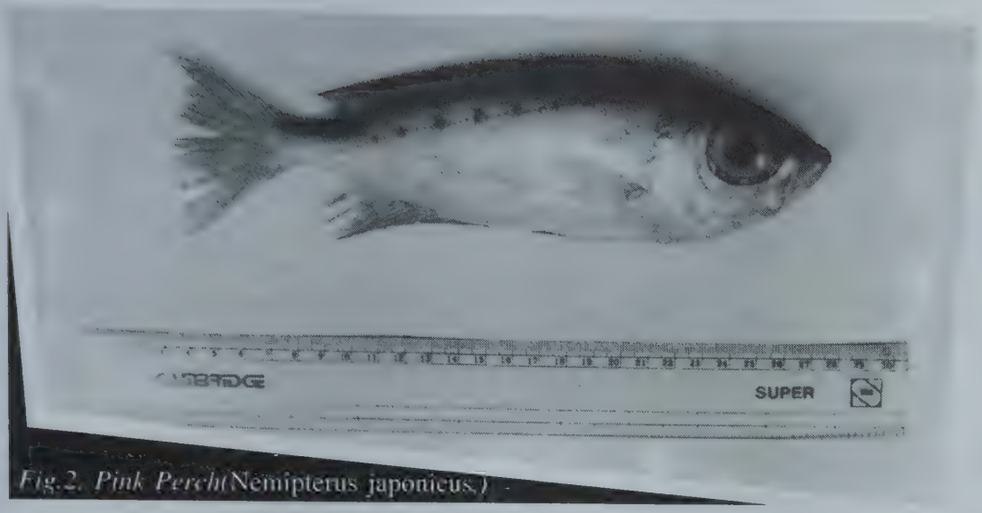


Fig.2. Pink Perch(Nemipterus japonicus.)

japonicus and *Priacanthus* spp. was collected from different pre processing centres in Veraval. It was washed well and the head meat was separated manually by removing the inedible portions like skull, operculum and gills. Mince was separated from this edible portion using Badar meat-bone separator. The meat was analysed for proximate composition as per standard procedures (A.O.A.C., 1995). The mince was washed in ice-cold potable water in 1:2 ratio. After washing the mince was pressed in muslin cloth to remove the excess water so that the original weight prior to washing was retained. Cutlets were prepared from this mince after cooking for 10 minutes as per the method described by Joseph *et. al* (1984). Thus cutlets were prepared from four different types of mince, i.e., mince from body meat of pink perch and big eye; mince from head waste of pink perch and big eye. Sensory qualities of the product were evaluated by the method of Joseph *et. al* (1984). An experienced panel comprising 10 trained panelists conducted taste panel studies.

Observations

The yield of Surimi in most of the fishes range from 18-25% and the yield of mince from small fishes vary between 35-40%. Studies conducted at C.I.F.T. has shown that filleting wastes of catfish, perches, ribbon fish, Jew fish etc. contains 6-9% recoverable meat which can be extracted by using a hand-operated meat bone separator. In the present study the mince yield from the pink perch waste was 14.5 % and that of big eye was 1 1.9 % of the head waste and the average extra mince yield from the whole fish was about 5% (Table 1). Organoleptic quality of the fresh mince from head waste was inferior when compared to body meat). The mince contained blood pigments in higher levels, which imparted a darker colour. When washed in potable chilled water the colour of the mince improved. The proximate composition of the meat is given in table 2.The protein content of the mince from *Nemipterus* head waste is found to be lower than that of *Priacanthus*.

Cutlets weighing 40 g each were prepared from all the samples; the body meat samples were taken as controls. The results of panel studies are given in table 3. It was observed that all the samples were acceptable with mean scores above 6. The cutlets prepared from the body meat mince of both species were superior in taste when compared to those prepared from the head waste mince. However, the latter also had good acceptability scores and the cutlets prepared from *Priacanthus* head waste mince had a better overall score than those prepared from pink perch. The texture of the product from *Priacanthus* head waste mince was firm and it had a good flavour when compared to that of *Nemipterus*. It is observed that different products prepared from *Priacanthus* had very good acceptance by the consumers.

Conclusion

On an average, more than 20 million tonnes of edible flesh from food harvested from marine and fresh water

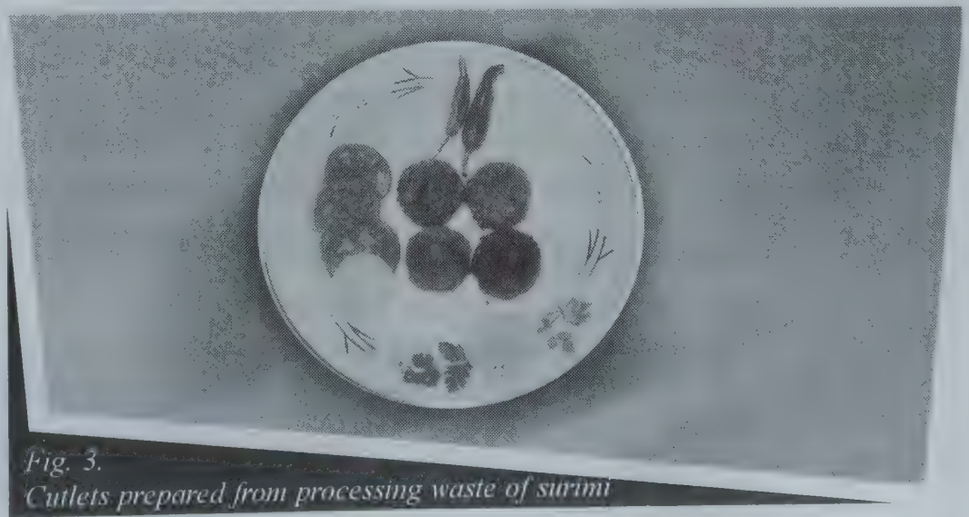


Fig. 3.
Cutlets prepared from processing waste of surimi

Flow chart for preparation of cutlet from head waste

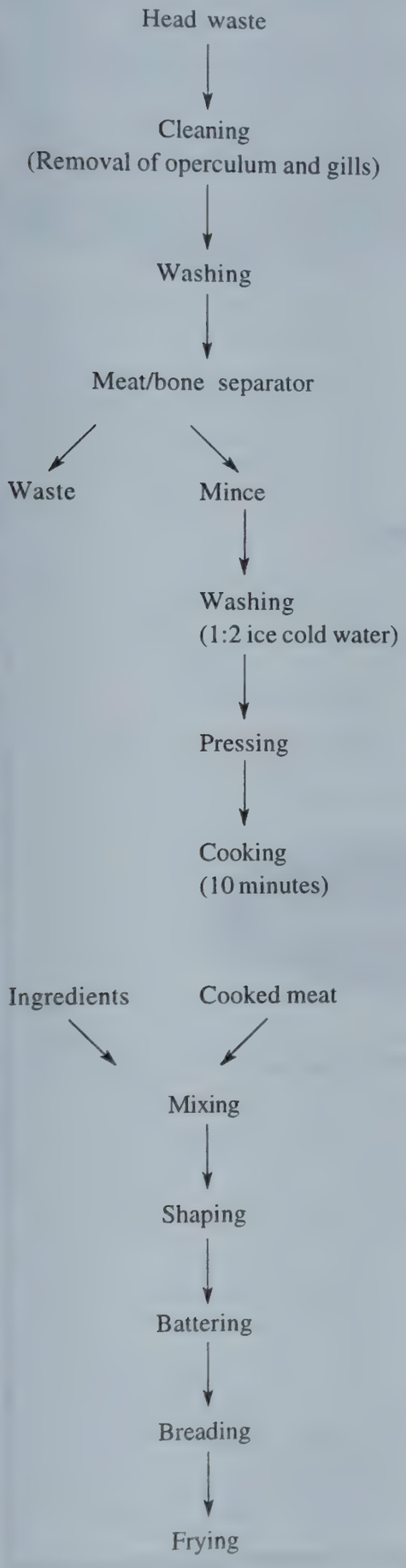


Table 1. Size and Yield from Nemipterus and Priacanthus

Fish	Size range (g)	Length range (cm)	head waste (%)	Yield of mince from waste (%)	Extra mince obtained from whole fish (%)
Nemipterus	70-160	22-29	31	14.5	4.5
Priacanthus	65-135	18-25	42	11.9	5.0

Table 2. Proximate Composition of Head Waste Mince

	Nemipterus	*Priacanthus*
Moisture	80.52%	80.32%
Crude Protein	16.24%	18.34%
Fat	2.10%	1.07%
Ash	1.56%	2.02%

Table 3. Mean Panel Scores for Cutlets Prepared from Different Mince

Parameters	Body meat *Nemipterus*	Body meat *Priacanthus*	Head waste *Nemipterus*	Head waste *Priacanthus*
Texture	6.6	7.3	6.0	6.2
Flavour	6.9	7.0	6.2	6.7
Taste	6.8	7.2	6.1	7.0
Overall acceptability	6.8	7.2	6.1	6.6

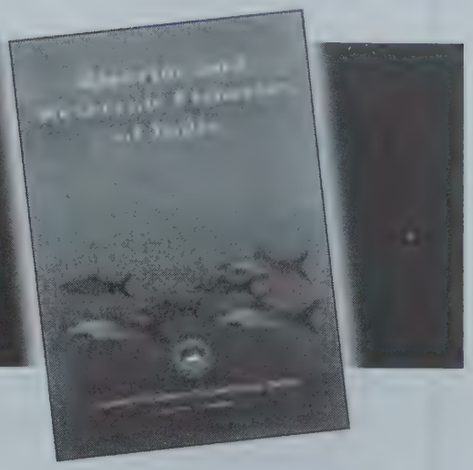
bodies of the world is grossly under utilized. Surimi production is a capital intensive, fast growing industry, generating a huge quantity of waste. Edible fish mince can be profitably recovered from the cutting wastes. This can be utilized for the preparation of a variety of value added and ready to serve products like wafers, burgers, bread spreads, fish patties etc. It is observed that low cost fish and fish wastes could also be converted to soluble protein hydrolysates, which is a source of readily assimilable protein and hence used in therapeutics. Other combination products can also be tried out from the mince recovered. Detailed study is needed to find out the acceptability and marketing potential of such products.

Acknowledgements

The authors are thankful to Dr. K. Devadasan, Director, C.I.F.T. for according permission to publish this paper. The technical assistance rendered by Sh. G.P. Vaghela and Sh. K.U. Sheikh is duly acknowledged.

Book Review

Riverine & Reservoir Fisheries of India*



The book, *Riverine and Reservoir Fisheries of India*, recently published by Society of Fisheries Technologists (India), Cochin contains edited versions of papers presented at the National Seminar on Riverine and Reservoir Fisheries - Challenges and Strategies, 23-24 May 2001, Cochin, India. The Seminar was jointly organized by Society of Fisheries Technologists (India), Cochin and Central Institute of Fisheries Technology, Cochin, in the context of emerging significance of inland open water fishery resources in the supply of nutritious food and in the economic well-being of the inland fishermen.

India has diverse and plentiful inland water resources, which is an important source of food and provides employment and sustenance to sizeable sections of the society. Rivers and reservoirs of India harbour a rich and varied spectrum of fish species, which include commercially important fishes such as Indian major carps, mahseer, minor carps, snow trouts, peninsular carps, catfishes, featherbacks, murrels and a number of exotic species. Riverine capture fishery resources have been showing a declining trend in recent years. Increased sedimentation of riverbed, water abstraction, environmental degradation, marked alteration in the river courses and indiscriminate fishing have been detrimental to the riverine fishery resources. Catches have declined from 1 t.km-1.yr1 in 1958 to 0.3 t.km-1.y-1 in 1995. Percentage contribution of the commercially important Indian major carps has also shown a similar decline, necessitating fishery enhancement efforts to reverse the trend. Reservoirs in India are considered to be a growing resource with enormous potential for yield augmentation through capture fisheries and extensive aquaculture. India has 19,370 reservoirs with a total surface area of 3.15x106 ha. Total production from Indian reservoirs is estimated at 93,650 t and the overall yield per hectare is 29.7 kg. Fishery experts believe that the overall annual production from Indian reservoirs could be raised at least up to 2,50,000 t, with adequate management measures such as optimum fishing effort, stocking support and mesh regulation. Sixty-two papers pertaining to Ecology, Resources, Culture and Capture Techniques, Post-harvest Technology and Fisheries Extension and Management, presented in this volume, cover many of these issues and spotlights.

The contents of the volume particularly focus on (i) reservoir fisheries development; (ii) ornamental fish culture and export trade; (iii) development of a consensus Code of Conduct for Responsible Fisheries (CCRF) for inland open water resources; (iv) revalidation of inland fishery resource database and development of Geographical Information System on inland water resources as a tool for effective fishery management; (v) conservation and management of inland resources, with accent on long-term sustainability of the fishery resources, protection of biodiversity and environmental safety; (vi) development of efficient post-harvest handling, processing, value addition, quality control, packaging and marketing practices for freshwater fishes; and (vii) extension, training and education in inland fisheries technology. This volume addresses the issues, highlights the present constraints in the development and proposes strategies for advancement of riverine and reservoir fisheries

The book is provided with a well-organised subject index based on key words and an author index. The papers are by and large well written, easy to read and liberally illustrated with colour and black & white plates, line diagrams and tables. In general, this is a splendid compilation of papers reflecting recent trends and directions for future research and development in riverine and reservoir fisheries. It is recommended as an important source of information to all those who are directly and indirectly involved in the development, management and responsible utilization of inland open water fishery resources.

To order: Secretary of Fisheries Technologists (India), P.O. Matsyapuri, Cochin – 682 029, India

Phone: 91-484-666845

Fax: 91-484-668212

E-mail: root@cift.ker.nic.in

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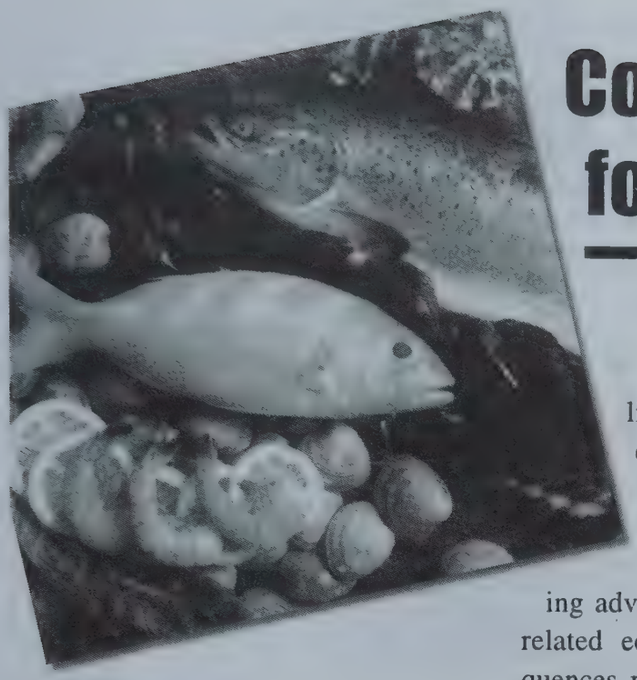
M.R Boopendranath, B. Meenakumari, Jose Joseph, T.V. Sankar, P. Pravin and Leela Edwin



Code of Conduct for Responsible Fisheries

contd. from last issue

9 - AQUACULTURE DEVELOPMENT

9.1 Responsible development of aquaculture, including culture-based fisheries, in areas under national jurisdiction

9.1.1 States should establish, maintain and develop an appropriate legal and administrative framework which facilitates the development of responsible aquaculture.

9.1.2 States should promote responsible development and management of aquaculture, including an advance evaluation of the effects of aquaculture development on genetic diversity and ecosystem integrity, based on the best available scientific information.

9.1.3 States should produce and regularly update aquaculture development strategies and plans, as required, to ensure that aquaculture development is ecologically sustainable and to allow the rational use of resources shared by aquaculture and other activities.

9.1.4 States should ensure that the livelihoods of local communities, and their access to fishing grounds, are not negatively affected by aquaculture developments.

9.1.5 States should establish effective procedures specific to aquaculture to undertake appropriate environmental assessment and monitoring with the aim of minimizing adverse ecological changes and related economic and social consequences resulting from water extraction, land use, discharge of effluents, use of drugs and chemicals, and other aquaculture activities.

9.2 Responsible development of aquaculture including culture-based fisheries within transboundary aquatic ecosystems

9.2.1 States should protect transboundary aquatic ecosystems by supporting responsible aquaculture practices within their national jurisdiction and by cooperation in the promotion of sustainable aquaculture practices.

9.2.2 States should, with due respect to their neighbouring States, and in accordance with international law, ensure responsible choice of species, siting and management of aquaculture activities which could affect transboundary aquatic ecosystems.

9.2.3 States should consult with their neighbouring States, as appropriate, before introducing non-indigenous species into transboundary aquatic ecosystems.

9.2.4 States should establish appropriate mechanisms, such as databases and information networks to collect, share and disseminate data related to their aquaculture activities to facilitate cooperation on planning for aquaculture development at the national, subregional, regional and global level.

9.2.5 States should cooperate in the development of appropriate mechanisms, when required, to monitor the impacts of inputs used in aquaculture.

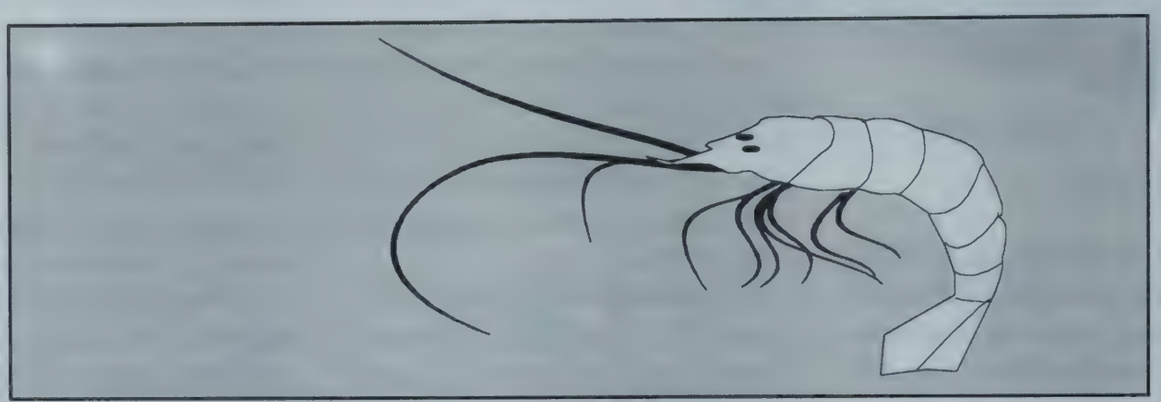
9.3 Use of aquatic genetic resources for the purposes of aquaculture including culture-based fisheries

9.3.1 States should conserve genetic diversity and maintain integrity of aquatic communities and ecosystems by appropriate management. In particular, efforts should be undertaken to minimize the harmful effects of introducing non-native species or genetically altered stocks used for aquaculture including culture-based fisheries into waters, especially where there is a significant potential for the spread of such non-native species or genetically altered stocks into waters under the jurisdiction of other States as well as waters under the jurisdiction of the State of origin. States should, whenever possible, promote steps to minimize adverse genetic, disease and other effects of escaped farmed fish on wild stocks.

9.3.2 States should cooperate in the elaboration, adoption and implementation of international codes of practice and procedures for introductions and transfers of aquatic organisms.

9.3.3 States should, in order to minimize risks of disease transfer and other adverse effects on wild and cultured stocks, encourage adoption of appropriate practices in the genetic improvement of broodstocks, the introduction of non-native species, and in the pro-

Our Secret Recipe for Quality



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Tel: 567767, 571039. Fax: 91 0891 567504

expertise and experience

duction, sale and transport of eggs, larvae or fry, broodstock or other live materials. States should facilitate the preparation and implementation of appropriate national codes of practice and procedures to this effect.

9.3.4 States should promote the use of appropriate procedures for the selection of broodstock and the production of eggs, larvae and fry.

9.3.5 States should, where appropriate, promote research and, when feasible, the development of culture techniques for endangered species to protect, rehabilitate and enhance their stocks, taking into account the critical need to conserve genetic diversity of endangered species.

9.4 Responsible aquaculture at the production level

9.4.1 States should promote responsible aquaculture practices in support of rural communities, producer organizations and fish farmers.

9.4.2 States should promote active participation of fishfarmers and their communities in the development of responsible aquaculture management practices.

9.4.3 States should promote efforts which improve selection and use of appropriate feeds, feed additives and fertilizers, including manures.

9.4.4 States should promote effective farm and fish health management practices favouring hygienic measures and vaccines. Safe, effective and minimal use of therapeutants, hormones and drugs, antibiotics and other disease control chemicals should be ensured.

9.4.5 States should regulate the use of chemical inputs in aquaculture which are hazardous to human health and the environment.

9.4.6 States should require that the disposal of wastes such as offal, sludge, dead or diseased fish, excess veterinary drugs and other hazardous chemical inputs does not constitute a hazard to human health and the environment.

9.4.7 States should ensure the food safety of aquaculture products and promote efforts which maintain product quality and improve their value through particular care before and during harvesting and on-site processing and in storage and transport of the products.

ARTICLE 10 - INTEGRATION OF FISHERIES INTO COASTAL AREA MANAGEMENT

10.1 Institutional framework

10.1.1 States should ensure that an appropriate policy, legal and institutional framework is adopted to achieve the sustainable and integrated use of the resources, taking into account the fragility of coastal ecosystems and the finite nature of their natural resources and the needs of coastal communities.

10.1.2 In view of the multiple uses of the coastal area, States should ensure that representatives of the fisheries sector and fishing communities are consulted in the decision-making processes and involved in other activities related to coastal area management planning and development.

10.1.3 States should develop, as appropriate, institutional and legal frameworks in order to determine the possible uses of coastal resources and to govern access to them taking into account the rights of coastal fishing communities and their customary practices to the extent compatible with sustainable development.

In view of the multiple uses of the coastal area, States should ensure that representatives of the fisheries sector and fishing communities are consulted in the decision-making processes

10.1.4 States should facilitate the adoption of fisheries practices that avoid conflict among fisheries resources users and between them and other users of the coastal area.

10.1.5 States should promote the establishment of procedures and mechanisms at the appropriate administrative level to settle conflicts which arise within the fisheries sector and between fisheries resource users and other users of the coastal area.

10.2 Policy measures

10.2.1 States should promote the creation of public awareness of the need for the protection and management of coastal resources and the participation in the management process by those affected.

10.2.2 In order to assist decision-making on the allocation and use of coastal resources, States should promote the assessment of their respective value taking into account economic, social and cultural factors.

10.2.3 In setting policies for the management of coastal areas, States should take due account of the risks and uncertainties involved.

10.2.4 States, in accordance with their capacities, should establish or promote the establishment of systems to monitor the coastal environment as part of the coastal management process using physical, chemical, biological, economic and social parameters.

10.2.5 States should promote multidisciplinary research in support of coastal area management, in particular on its environmental, biological, economic, social, legal and institutional aspects.

10.3 Regional cooperation

10.3.1 States with neighbouring coastal areas should cooperate with one another to facilitate the sustainable use of coastal resources and the conservation of the environment.

10.3.2 In the case of activities that may have an adverse transboundary environmental effect on coastal areas, States should:

a. provide timely information and, if possible, prior notification to potentially affected States; and

b. consult with those States as early as possible.

10.3.3 States should cooperate at the subregional and regional level in order to improve coastal area management.

10.4 Implementation

10.4.1 States should establish mechanisms for cooperation and coordination among national authorities involved in planning, development, conservation and management of coastal areas.

10.4.2 States should ensure that the authority or authorities representing the fisheries sector in the coastal management process have the appropriate technical capacities and financial resources.

11 - POST-HARVEST PRACTICES AND TRADE

11.1 Responsible fish utilization

11.1.1 States should adopt appropriate measures to ensure the right of consumers to safe, wholesome and unadulterated fish and fishery products.

11.1.2 States should establish and maintain effective national safety and quality assurance systems to protect consumer health and prevent commercial fraud.

11.1.3 States should set minimum standards for safety and quality assurance and make sure that these standards are effectively applied throughout the industry. They should promote the implementation of quality standards agreed within the context of the FAO/WHO Codex Alimentarius Commission and other relevant organizations or arrangements.

11.1.4 States should cooperate to achieve harmonization, or mutual recognition, or both, of national sanitary measures and certification programmes as appropriate and explore possibilities for the establishment of mutually recognized control and certification agencies.

11.1.5 States should give due consideration to the economic and social role of the post-harvest fisheries sector when formulating national policies for the sustainable development and utilization of fishery resources.

11.1.6 States and relevant organizations should sponsor research in fish technology and quality assurance and support projects to improve post-harvest handling of fish, taking into account the economic, social, environmental and nutritional impact of such projects.

11.1.7 States, noting the existence of different production methods, should through cooperation and by facilitating the development and transfer of appropriate technologies, ensure that processing, transporting and storage methods are environmentally sound.

11.1.8 States should encourage those involved in fish processing, distribution and marketing to:

a. reduce post-harvest losses and waste;

b. improve the use of by-catch to the extent that this is consistent with responsible fisheries management practices; and

c. use the resources, especially water and energy, in particular wood, in an environmentally sound manner.

States should ensure that environmental effects of post- harvest activities are considered in the development of related laws, regulations and policies without creating any market distortions.

11.1.9 States should encourage the use of fish for human consumption and promote consumption of fish whenever appropriate.

11.1.10 States should cooperate in order to facilitate the production of value-added products by developing countries.

11.1.11 States should ensure that international and domestic trade in fish and fishery products accords with sound conservation and management practices through improving the identification of the origin of fish and fishery products traded.

11.1.12 States should ensure that environmental effects of post- harvest activities are considered in the development of related laws, regulations and policies without creating any market distortions.

11.2 Responsible international trade

11.2.1 The provisions of this Code should be interpreted and applied in accordance with the principles, rights and obligations established in the World Trade Organization (WTO) Agreement.

11.2.2 International trade in fish and fishery products should not compromise the sustainable development of fisheries and responsible utilization of living aquatic resources.

11.2.3 States should ensure that measures affecting international trade in fish and fishery products are transparent, based, when applicable, on scientific evidence, and are in accordance with internationally agreed rules.

11.2.4 Fish trade measures adopted by States to protect human or animal life or health, the interests of consumers or the environment, should not be discriminatory and should be in accordance with internationally agreed trade rules, in particular the principles, rights and obligations established in the Agreement on the Application of Sani-

tary and Phytosanitary Measures and the Agreement on Technical Barriers to Trade of the WTO.

11.2.5 States should further liberalize trade in fish and fishery products and eliminate barriers and distortions to trade such as duties, quotas and non-tariff barriers in accordance with the principles, rights and obligations of the WTO Agreement.

11.2.6 States should not directly or indirectly create unnecessary or hidden barriers to trade which limit the consumer's freedom of choice of supplier or that restrict market access.

11.2.7 States should not condition access to markets to access to resources. This principle does not preclude the possibility of fishing agreements between States which include provisions referring to access to resources, trade and access to markets, transfer of technology, scientific research, training and other relevant elements.

11.2.8 States should not link access to markets to the purchase of specific technology or sale of other products.

11.2.9 States should cooperate in complying with relevant international agreements regulating trade in endangered species.

11.2.10 States should develop international agreements for trade in live specimens where there is a risk of environmental damage in importing or exporting States.

11.2.11 States should cooperate to promote adherence to, and effective implementation of relevant international standards for trade in fish and fishery products and living aquatic resource conservation.

11.2.12 States should not undermine conservation measures for living aquatic resources in order to gain trade or investment benefits.

11.2.13 States should cooperate to develop internationally acceptable rules or standards for trade in fish and fishery products in accordance with the principles, rights, and obligations established in the WTO Agreement.

11.2.14 States should cooperate with each other and actively participate in relevant regional and multilateral fora, such as the WTO, in order to ensure equitable, non-discriminatory trade in fish and fishery products as well as wide adherence to multilaterally agreed fishery conservation measures.

11.2.15 States, aid agencies, multilateral development banks and other relevant international organizations should ensure that their policies and practices related to the promotion of international fish trade and export production do not result in environmental degradation or adversely impact the nutritional rights and needs of people for whom fish is critical to their health and well being and for whom other comparable sources of food are not readily available or affordable.

11.3 Laws and regulations relating to fish trade

11.3.1 Laws, regulations and administrative procedures applicable to international trade in fish and fishery products should be transparent, as simple as possible, comprehensible and, when appropriate, based on scientific evidence.

11.3.2 States, in accordance with their national laws, should facilitate appropriate consultation with and participation of industry as well as environmental and consumer groups in the development and implementation of laws and regulations related to trade in fish and fishery products.

Laws, regulations and administrative procedures applicable to international trade in fish and fishery products should be transparent, as simple as possible, comprehensible and, when appropriate, based on scientific evidence.

11.3.3 States should simplify their laws, regulations and administrative procedures applicable to trade in fish and fishery products without jeopardizing their effectiveness.

11.3.4 When a State introduces changes to its legal requirements affecting trade in fish and fishery products with other States, sufficient information and time should be given to allow the States and producers affected to introduce, as appropriate, the changes needed in their processes and procedures. In this connection, consultation with affected States on the time frame for implementation of the changes would be desirable. Due consideration should be given to requests from developing countries for temporary derogations from obligations.

11.3.5 States should periodically review laws and regulations applicable to international trade in fish and fishery products in order to determine whether the conditions which gave rise to their introduction continue to exist.

11.3.6 States should harmonize as far as possible the standards applicable to international trade in fish and fishery products in accordance with relevant internationally recognized provisions.

11.3.7 States should collect, disseminate and exchange timely, accurate and pertinent statistical information on international trade in fish and fishery products through relevant national institutions and international organizations.

11.3.8 States should promptly notify interested States, WTO and other appropriate international organizations on the development of and changes to laws, regulations and administrative procedures applicable to international trade in fish and fishery products.

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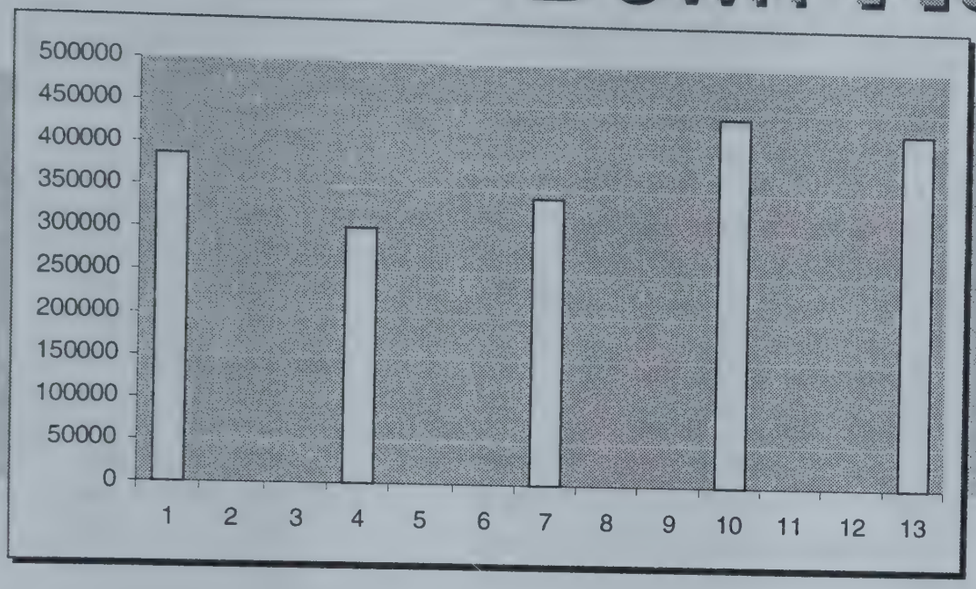
Seafood Exports Fail To Meet Target, Down 7.56% On Global Slump



Countrie's Seafood Export To The US, European Union And South East Asia Registered a rise in Quantity And Value during the Financial Year 2001-2002

Export of marine products de clined considerably during 2001-02 on account of Global economic recession and drastic decline in price realization for our prime product Black tiger Shrimp in international market. During 2000-2001 our export was to the tune of 424470 MT valued at Rs. 5957.05 crore equivalent to US $ 1253.35 million registering a decline of 3.63% in quantity and 7.56% in rupee realization and 11.51% in US $ realization. The unit value realization is declined to Rs140.34 (US$2.95) from Rs. 146.29 (US$3.22). Details of export for the last 5 years are furnished below.

MAJOR ITEMS

Frozen shrimp continued to be the largest item in terms of value. Shrimp contributed 30.07% in volume and 69.36% in value of the total export of marine products from India. The share of shrimp in export has increased to 30.07% from 25.40% during the previous year. However the share of value remained static. This is mainly due to the decline in international price for Black Tiger Shrimp owing to various reasons like global economic recession increase in Aquaculture production, Shrimp disease and subsequent early harvest in many competing countries etc.

Share of Fr. Fish declined both in terms of volume and value. However, it continued to be the largest items of export in terms of volume. The share of Fr. Fish declined from 48.33% to 41.22% in volume and from 13.58% to 11.97% in value. The declined is mainly attributed to the low landing of Ribbon fish, share of cephalopods remaining almost static. However, export of Live items like Aquarium fish, Live Lobster and Live shrimp showed a positive growth. New items like Live Baigai (Whelk) were exported from Thiruvanthapuram airport for the first time. Export of Chilled items also showed a declining trend. Details of item-wise export of marine products for the last 2 years are furnished below.

1997-98	Q	385818	+7619	+02.01	
	V	**4697.48**	**+ 576.12**	**+ 13.98**	**121.75**
	$	1295.86	+143.03	+12.41	3.36
1998-99	Q	302934	-82884	-21.48	
	V	**4626.87**	**- 70.61**	**- 01.50**	**152.73**
	$	**1106.91**	**- 188.95**	**- 14.58**	**3.65**
1999-00	Q	340003	+37069	+12.24	
	V	**5095.73**	**+ 468.87**	**+ 10.13**	**149.87**
	$	1184.23	+77.32	+06.99	3.49
2000-01	**Q**	**440473**	**+97443**	**+28.41**	
	V	6443.89	+1327.22	+19.12	146.29
	$	**1416.32**	**+227.31**	**+19.12**	**3.22**
2001-02	Q	424470	-16003	-3.63	
	V	**5957.05**	**-486.84**	**-7.56**	**140.36**
	$	1253.35	-16297	-11.51	2.95

ITEM WISE EXPORT OF MARINE PRODUCTS
Q: QUANTITY IN M T, V: IN RS. CRORE, $: US$ IN MILLION , UV$: UNIT VALUE IN US$/KG

ITEMS	%share to Total		APRIL-MARCH 2001-2002	APRIL-MARCH 2000-2001	VARIATION	(%)
Frozen Shrimp	30.07	Q	127656	111874	15782	14.11
	69.36	V	4131.67	4481.51	-349.84	-7.81
	69.36	$	869.29	985	-115.71	-11.8
		UV$	6.81	8.8	-1.99	-22.6
Frozen Fin fish	41.22	Q	174976	212903	-37927	-17.8
	11.97	V	713.11	874.68	-161.57	-18.5
	11.97	$	150.04	192.25	-42.21	-22
		UV$	0.86	0.9	-0.04	-4.44
Frozen Cuttlefish	7.20	Q	30568	33677	-3109	-9.23
	4.70	V	280.07	288.99	-8.92	-3.09
	4.70	$	58.93	63.52	-4.59	-7.23
		UV$	1.93	1.89	0.04	2.12
Frozen Squid	9.37	Q	39790	37628	2161	5.74
	5.53	V	329.67	324.43	5.24	1.61
	5.53	$	69.36	71.31	-1.95	-2.73
		UV$	1.74	1.9	-0.16	-8.42
Dried items	1.66	Q	7047	7512	-465	-6.19
	1.15	V	68.36	70.03	-1.67	-2.39
	1.15	$	14.38	15.39	-1.01	-6.56
		UV$	2.04	2.05	-0.01	-0.49
Live items	0.39	Q	1654	1844	-190	-10.3
	0.68	V	40.66	39.88	0.78	1.95
	0.68	$	8.55	8.77	-0.21	-2.39
		UV$	5.17	4.75	0.42	8.84
Chilled items	0.77	Q	3284	3820	-535	-14
	1.07	V	63.66	71.63	-7.97	-11.1
	1.07	$	13.39	15.74	-2.35	-14.9
		UV$	4.08	4.12	-0.04	-0.97
Others	9.30	Q	39495	31215	8280	26.53
	5.54	V	329.86	292.74	37.12	12.68
	5.54	$	69.4	64.34	5.06	7.86
		UV$	1.76	2.06	-0.3	-14.6
Total	100.00	Q	424470	440473	-16003	-3.63
	100.00	V	5957.05	6443.89	-486.84	-7.56
	100.00	$	1253.35	1416.32	-162.97	-11.5
		UV$	2.95	3.22	-0.27	-8.39

Japan, major market for Indian Seafoods, has shown less import from here during the period. Despite a dip in Japanese imports in value terms Japan continued to be India's major buyer. In quantity terms, China top the list with 31.75% followed by EU with 19.53%

MAJOR MARKETS

Japan continued to be the largest market for Indian Marine products. Its share in volume remained almost static but the value wise share has declined to 30.56% from 39.731%. This may be due to fall price for our major item Black Tiger.

In spite of the terrorist attack on 11th September 2001, export to USA has registered a substantial increase in the share from 9.48% to 11.55% in volume and 18.07% to 23.86% in value. The share of EU also increased from 15.63% to 19.53% in volume and 15.91% to 19.31% in value. Export to China has declined considerably both in volume and value. The share of China declined from 41.49% to 31.75% in volume and 12.84% to 10.03% in value. The share of South East Asia also increased from 9.25% in volume to 12.35% and from 7.19% to 9.04% in value. Even though the share of Middle East market has increased in terms of quantity it registered a decline in rupee realization by 3.85% and US $ realization by 7.97% when compared to last year. Other markets like Australia, Isreal, Mauritius etc. registered a positive growth. New markets like Mozambique, Tunisia, Nigeria & Algeria have emerged during this year. Details of country wise export is furnished below:

COUNTRYWISE EXPORT OF MARINE PRODUCTS
Q:Quantity in M T, V: Value in Rs. Crore, $: US Dollar Million

COUNTRY	% share to Total		APRIL-MARCH 2001-2002	APRIL-MARCH 2000-2001	VARIATION	%
Japan	15.29	Q	64905	68983	-4078	-5.91
	30.56	V	1820.69	2560.39	-739.69	-28.89
	30.56	$	383.07	562.75	-179.68	-31.93
USA	11.55	Q	49041	41747	7294	17.47
	23.86	V	1421.38	1164.4	256.97	22.07
	23.86	$	299.05	255.93	43.13	16.85
European Union	19.53	Q	82895	68827	14068	20.44
	19.31	V	1150.07	1025.36	124.71	12.16
	19.31	$	241.97	225.37	16.61	7.37
CHINA	31.75	Q	134767	182771	-48004	-26.26
	10.03	V	597.23	827.42	-230.19	-27.82
	10.03	$	125.66	181.86	-56.21	-30.91
South East Asia	12.35	Q	52424	40748	11676	28.65
	9.04	V	538.75	462.97	75.79	16.37
	9.04	$	113.35	101.76	11.6	11.4
Middle East	4.51	Q	19159	17236	1923	11.16
	3.04	V	181.06	188.32	-7.25	-3.85
	3.04	$	38.1	41.39	-3.3	-7.97
OTHERS	5.01	Q	21278	20161	1117	5.54
	4.16	V	247.86	215.04	32.82	15.26
	4.16	$	52.15	47.26	4.89	10.35
TOTAL	100.00	Q	424470	440473	-16003	-3.63
	100.00	V	5957.05	6443.89	-486.84	-7.56
	100.00	$	1253.35	1416.32	-162.97	-11.51

In value terms Chennai port maintained its first position contributing 26.36% of the total Seafood Export from India followed by Kochi 15.63%

PERFORMANCE OF THE SEAPORTS/AIRPORTS

Chennai continued to be the largest port with a share of 26.36% in value and 9.78% in volume. The share of volume has increased from 8.12% to 9.78% however the value wise share declined due to low realization. Share of Kochi decline to 16.97% from 20.06% in volume and to 15.63% from 16.04% in value. The decline in volume was mainly due to the decrease in export of Ribbon Fish owing to poor landings.

Share of Vizag in volume terms remained static but in value terms it declined to 12.96% from 15.09% share of Pipavavu increased to 18.40% from 11.86% in volume and to 6% from 3.80% in value. Share of Tuticorin, Karwar, Kolkatta, etc. remained almost static. Share of export from Mumbai, Porbandar, Kandla etc. also declined. A new port viz. Kakinada emerged during this year. Export of Paradeep also started to take place during this year. Export from Mangalore, Goa and Trivandrum alone showed growth when compared to previous year.

PORT WISE EXPORT OF MARINE PRODUCTS
Q: QUANTITY IN M T, V: IN RS. CRORE, $: US$ IN MILLION

Ports	% share to total		APR-MAR 2001-2002	APR-MAR 2000-2001	VARIATION	(%)
CHENNAI	9.78	Q	41517	35772	5745	16.06
	26.36	V	1570.13	1766.07	-195.95	-11.1
	26.36	$	330.35	388.17	-57.82	-14.9
KOCHI	16.97	Q	72035	88355	-16320	-18.47
	15.63	V	930.87	1033.65	-102.78	-9.94
	15.63	$	195.85	227.19	-31.34	-13.79
VIZAG	5.22	Q	22154	23050	-896	-3.89
	12.96	V	771.81	972.72	-200.91	-20.65
	12.96	$	162.39	213.8	-51.41	-24.05
J N P	21.55	Q	91483	100348	-8865	-8.83
	11.74	V	699.19	690.69	8.49	1.23
	11.74	$	147.11	151.81	-4.7	-3.1
CALCUTTA	4.17	Q	17692	18553	-860	-4.64
	8.8	V	523.94	595.4	-71.46	-12
	8.8	$	110.24	130.86	-20.63	-15.76
TUTICORIN	4	Q	16966	17233	-267	-1.55
	7.49	V	446.27	498.71	-52.44	-10.52
	7.49	$	93.89	109.61	-15.72	-14.34
PIPAVAV	18.4	Q	78097	52219	25877	49.55
	6	V	357.38	244.72	112.66	46.04
	6	$	75.19	53.79	21.4	39.78
KAKINADA	1.05	Q	4477	0	4477	***
	3.1	V	184.72	0	184.72	***
	3.1	$	38.87	0	38.87	***
KANDLA	6.63	Q	28143	40228	-12086	-30.04
	2.75	V	163.55	242.98	-79.43	-32.69
	2.75	$	34.41	53.4	-18.99	-35.56
PORBANDAR	6.11	Q	25935	31712	-5777	-18.22
	1.76	V	104.79	127.95	-23.16	-18.1
	1.76	$	22.05	28.12	-6.07	-21.59

MUMBAI	1.37	Q	5803	17467	-11663	-66.78
	1.44	V	85.54	200.73	-115.19	-57.39
	1.44	$	18	44.12	-26.12	-59.2
MANGALORE/ICD	1.75	Q	7423	3781	3642	96.33
	0.93	V	55.42	21.98	33.44	152.1
	0.93	$	11.66	4.83	6.83	141.4
GOA	2.35	Q	9979	8849	1130	12.77
	0.58	V	34.48	27.92	6.56	23.5
	0.58	$	7.26	6.14	1.12	18.24
TRIVANDRUM	0.17	Q	721	497	223	44.9
	0.33	V	19.69	12.82	6.86	53.53
	0.33	$	4.14	2.82	1.32	46.81
KARWAR	0.47	Q	2007	2410	-403	-16.71
	0.13	V	7.96	7.53	0.44	5.79
	0.13	$	1.68	1.65	0.02	1.21
PARADEEP	0.01	Q	40	Neg	39	****
	0.02	V	1.32	0.01	1.3	****
	0.02	$	0.28	Neg	0.27	****
Total	100	Q	424470	440473	-16003	-3.63
	100	V	5957.05	6443.89	-486.84	-7.56
	100	$	1253.35	1416.32	-162.97	-11.51

Research Project on fish marketing and socio-economics of NEH Region/ New research initiative of CIFT

Fish is an important food stuff for people of NEH region. The present annual fish production in the NEH region is about 50% less of the total demand and the gap is filled by transporting fish from Andhra Pradesh, Tamil Nadu, Gujarat and Kerala. Women play a very important role in production and marketing of fish. The Jagirod fish market which is the biggest dry fish market in Asia is the centre point for supply of dry fish to different parts of NEH region. The project envisaged forms a part of the implementation of R&D and extension programme in the NEH region which is a special component in the plan outlay of the Institute. A brief survey of technological needs in fish harvest and post-harvest sectors of Assam, Meghalaya and Arunachal Pradesh was conducted by the Institute in two phases in 2001. The scientific team consisted of Dr. Krishna Srinath, Shri K.P. Antony, Shri M. Nasar, Dr. M.M. Prasad, Shri Prem Kumar and Shri M.V. Baiju. The survey covered the fishing practices in reservoirs, bheels, fish landing centres, fish markets, fish culture practices, processing, packaging and storage practices, aqua culture socio-economics and training needs, The project now proposed based on the above survey with Dr. Krishna Srinath, Head, Extension, Information & Statistics Division as the Principal Investigator and Dr. Nikita Gopal and Shri V. Radhakrishnan Nair, Scientists as Co-investigators is for a period of two years with an outlay of Rs.9.25 lakhs.

The study is expected to serve as a bench mark for future investigations in this region. As a long term objective it may lead to the development of an information base regarding the socio-economic and cultural aspects related to fisheries and fisher persons and the marketing structure and functions of the NEH region, so that suitable technology and policy interventions can be formulated.

NEWS & NOTES

Vietnam Mildly Protests Law Banning Name of Catfish, while sales increase

Shakespeare's Romeo said 'What s in a name:, That which we call a rose By any other name would smell as sweet.' Such seems to be the case with Vietnamese catfish.

Although, Vietnam protested the new U.S. farm law, which prohibits any species other than Ictaluriidae family being labeled catfish in the U.S., exports of Vietnamese Basa or Tra catfish have soared during the first part of this year. Through March, sales of Vietnamese basa in the U.S. reached $30 million, vs. $22 million for the same period last year.

The problem for U.S. catfish farmers is that the market likes the Vietnamese product, and buyers will continue to source it, no matter what the name.

In fact, there are hundreds of types of catfish around the world, which have been recognized by scientists and by commercial seafood companies for many years, and an act of Congress is not going to change that. So the victory for the domestic industry may be symbolic only. The fact is that buyers were not buying Vietnamese catfish because they were fooled by the name, but because it proved to be a good product, liked by their customers.

Yesterday, the Vietnamese Foreign Ministry said the Farm Bill violated the spirit of the bilateral trade agreement that took effect last December.

'We consider this an unfair protectionist act which runs counter to scientific principles, international practice, and trade liberalization policies which the United States itself is pursuing,' said Foreign Ministry spokeswoman Phan Thuy Thanh.

'Once again, U.S. actions speak louder than words, and we have shown our country to be as protectionist as any of the foreign markets that our exporters have long complained about.'

President Signs Farm Bill With Country of Origin Provision

Despite strong opposition from the food industry, President Bush has signed the farm bill that includes country of origin labeling requirements. The labeling will come into effect within 3 years, and will apply to all imported produce, meat and seafood. FMI, which opposed the legislation, estimates the cost to the industry for compliance will be $1 billion. Until 2005, labeling for country of origin will remain voluntary.

Several Groups Endorse Kennedy Bill to Restrict Use of Antibiotics in Feeds

A coalition of health, consumer, agricultural, environmental and other advocacy groups with more than nine million members joined the American Public Health Association in endorsing a bill introduced by U.S. Senator Edward M. Kennedy, D-MA, to phase out the routine feeding of medically important antibiotics to healthy farm animals. The legislation, 'The Preservation of Antibiotics for Human Treatment Act of 2002,' is similar to a bipartisan bill pending in the U.S. House (H.R. 3804, introduced by Rep. Sherrod Brown, D-OH), which has been endorsed by the American Medical Association, KAW, and others.

The Kennedy bill introduction coincides with the release of a new report by the Alliance for the Prudent Use of Antibiotics (APUA) that concludes antibiotic use in farm animals 'contributes to the growing problem of [antibiotic] resistance in human infections,' which 'limits treatment options, raises healthcare costs, and increases the number, severity and duration of infections.'

'The APUA report confirms that using medically important antibiotics in healthy farm animals contributes to antibiotic resistant infections in people. The science is clear, and the time for action is now,' said Tamer Barlam, M.D., an infectious disease physician at the Center for Science in the Public Interest and a former faculty member at Harvard Medical School. 'Sen. Kennedy's bill will help keep antibiotics working for people who depend on antibiotics for their vary survival, such as cancer patients, premature babies, and seniors, but all of us will benefit.'

Both the Kennedy bill and the House bill also would ban the use of Cipro-like antibiotics to treat sick poultry because that use is promoting the development of potentially deadly Cipro-resistant food poisoning infections in people. The U.S. Food and Drug Administration has proposed to ban the drug, but the sole remaining manufacturer of these drugs for poultry, the Bayer Corp., is fighting it.

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